A Survey of Close, Young Stars with SDI at the VLT and MMT

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We discuss the results of a survey of young (<300 Myr), close (<50 pc) stars with the Simultaneous Differential Extrasolar Planet Imager (SDI) implemented at the VLT and the MMT. SDI uses a double Wollaston prism and a quad filter to take images simultaneously at 3 wavelengths surrounding the 1.62 um methane bandhead found in the spectrum of cool brown dwarfs and gas giants. By performing a difference of images in these filters, speckle noise from the primary can be significantly attenuated, resulting in photon and flat-field noise limited data. In our survey data, we achieved H band contrasts > 25000 (5sigma Delta F1(1.575 um) > 10 mag, Delta H > 10.6 mag for a T6 spectral type) at a separation of 0.5 arcsec from the primary star. With this degree of attenuation, we can image (5 sigma detection) a 2-4 Jupiter mass planet at 5 AU around a 30 Myr star at 10 pc. We have obtained complete datasets for ~50 stars. We believe that our SDI images are the highest contrast astronomical images ever made from ground or space for methane rich companions. We also discuss preliminary results of an experiment at the High Contrast Imaging Testbed at JPL using a similar SDI multiwavelength differential imaging scheme bracketing the Oxygen (A) telluric absorption feature at 0.762 um.